

## Mothers' Knowledge, Beliefs and Attitudes regarding Shaken Baby Syndrome Hazards

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### Abstract

**Background:** Shaken baby syndrome (SBS) also known as abusive head trauma (AHT) is signifies a constellation of symptoms and signs, such as subdural hematoma, retinal hemorrhages and encephalopathy, often referred to as 'the triad' as caused by violent shaking. It is the leading cause of traumatic death and the leading cause of child abuse fatalities, accounts for more than 50% of accidental injuries and is the most common cause of death among newborn-infants. **Aim of study:** to assess mothers' knowledge, beliefs and attitudes regarding Shaken baby syndrome hazards. **Research design:** An exploratory descriptive research design was used to achieve the aim of the present study and answer the research questions. A convenient **sample** of 384 mothers who admitted to outpatient and inpatient pediatric department at Minia university hospital for obstetric and pediatric. **Two tools** were utilized to measure the variables of the study included; **Tool I:** Structured interview questionnaire were developed by the researchers that include **Part I:** Socio-demographic data of mothers such as age, number of children, residence, educational level, etc. **Part II:** Predesigned questionnaire to explore shaken baby syndrome hazards knowledge. **Tool II:** Likert Scale of 15 item that measure mothers, beliefs and attitudes regarding shaken baby syndrome hazards. **Results:** it was found that high percentage of mothers' knowledge regarding shaken baby syndrome hazards is unsatisfactory 76.0% and 91.9 % of the mothers participate in the study have inappropriate attitudes and beliefs regarding shaken baby syndrome hazards. There was a positive relation between knowledge level, attitudes and beliefs, a negative relation of parent education and occupation and mothers' knowledge regarding shaken baby syndrome hazards and positive relation between family income and knowledge, beliefs and attitudes regarding shaken baby syndrome hazards. **Conclusion:** high percentage the majority of studied mothers' knowledge regarding shaken baby syndrome hazards was unsatisfactory and inappropriate attitudes and beliefs regarding shaken baby syndrome hazards. **Recommendations:** Applying educational and prevention programs for mothers and pediatric nurses about hazards of shaken baby syndrome. **Keywords:** shaken baby syndrome, Mothers' knowledge, Mothers' beliefs and attitudes

### Introduction

Shaken baby syndrome (SBS) also known as abusive head trauma (AHT), it is a constellation of symptoms and signs, such as subdural hematoma, retinal hemorrhages and encephalopathy, often referred to as 'the triad' as caused by violent shaking. (Alshahrani et al., 2018).

Shaken baby syndrome is the leading cause of traumatic death and child abuse fatalities. Homicide is the leading cause of injury-related deaths in infants younger than four years. Serious injuries in infants, particularly those that result in death, are rarely accidental unless there is another clear explanation, such as trauma from a motor vehicle crash. When uncomplicated documented that 80% of deaths from head trauma in infants and children younger than two years were the result of non-accidental trauma. Shaken baby syndrome is unlikely to be an isolated event, evidence of prior child abuse is common. (Tursz and Cook, 2014).

The immediate and long-term outcomes of head injury caused by shaken baby syndrome are worse than head injuries from other causes. At least one of every four victims die, and more than 50% have some type of residual neurological or visual impairment, or both. In 2000 approximately 1200 children died of neglect or abuse; 44% of them were infants less than one year of age. The majority of deaths related to head injuries in children less than two years old were a result of non-accidental trauma. The National Center on Shaken Baby Syndrome reported that more than 500 shaken baby syndrome cases, either fatal or nonfatal, occurred in the United States. The response rate in this study was only 42% (46 out of 113 surveys) and only 46% of the respondents reported survivors of shaken baby syndrome. Since cases with less serious injuries may not receive medical

attention, or may go undetected, and no central shaken baby syndrome reporting registry is available, the actual incidence of shaken baby syndrome is unknown and likely underestimated. (Chevignard and Lind, 2014).

Normal interaction with a child, like bouncing the baby on a knee, will not cause these injuries, although it's important to never shake a baby under any circumstances because gentle shaking can rapidly escalate. The more serious the child's neurological injury, the more severe the symptoms and the shorter the period of time between the shaking and the appearance of symptoms. From the time of the shaking these children do not look or act as usual - they may not eat or sleep or play normally. (Ningolleima, 2012).

When someone forcefully shakes a baby, the child's head rotates about the neck uncontrollably because infants' neck muscles aren't well developed and provide little support for their heads. This violent movement pitches the infant's brain back and forth within the skull, sometimes rupturing blood vessels and nerves throughout the brain and tearing the brain tissue. The brain may strike the inside of the skull, causing bruising and bleeding to the brain. (Adamsbaum et al., 2010).

Babies who are shaken may be brought to medical attention by a caregiver who offers no history of injury, a vague account of events or an explanation that is not consistent with the physical findings. Unless the physician is aware of the possibility of abuse and knowledgeable about the signs of Shaken Baby Syndrome, the cause of these children's symptoms can be missed. (Argo et al., 2019).

The identification, evaluation, investigation, management and prevention of Shaken Baby Syndrome require a multi-disciplinary approach that relies on the

knowledge, skills, mandate and jurisdictional responsibilities of key disciplines. There is a need for shared commitment and coordination among health, child welfare, police, social services, justice and education professionals, as well as the community at large. Knowledge of Shaken Baby Syndrome should be provided in the professional education of all the involved disciplines, and ongoing education needs to be provided as new developments occur in the field and education is given to prevent this syndrome in the world especially in developed countries. (Ningolleima, 2012).

### Significance of the Study

Shaken baby syndrome accounts for more than 50% of accidental injuries and is the most common cause of death among newborn-infants, 21-74 per 100,000 children worldwide are victims of shaken baby syndrome annually and 25%-30% of all shaken babies die from their injuries. The remaining 75% can suffer severe brain damage. Approximately 60% of SBS victims either die from their injuries at a later time or suffer lifelong disabilities (International Society for Prevention of Child Abuse and Neglect (ISPCAN), 2018).

One international study found that prevalence of shaking infant one year of age or younger was between 20% to 63% in 9 of 16 communities sampled in Brazil, Chile, Egypt, India, and the Philippines. It is estimated that somewhere between 1,400 and 10,000 cases of shaken baby syndrome occur each year in the United States alone. (Rnyan et al., 2010).

Majority of infant morbidities and mortalities occur due to unawareness of parents, especially the mothers' insufficient knowledge or misunderstanding of maternal and neonatal care during this period. Neonatal morbidity and mortality have dramatic challenges, both for the health care system and families. Therefore, it is crucial to evaluate the mothers' knowledge of infant care and the affecting factors. (Adib-Hajbaghery and Khosrojerdi, 2017).

Fewer studies could be located that has assessed the mothers' knowledge, believes and attitude regarding shaken baby syndrome hazards. Hence, the current study is undertaken to explore the knowledge, believes and attitude of the mothers concerning shaken baby syndrome among newborn infants. Results of the current study may help in evaluation of the mother's knowledge, believes and attitude as well as providing guidance, evidences and recommendations that should be reflected in neonatal nursing education and practice. Hopefully, the results of the current study could help clinical pediatric nurses design appropriate discharge education programs for mothers of newborn infants.

### Aim of the Study

To explore mothers' knowledge, believes and attitudes regarding shaken baby syndrome hazards.

### Research Questions

The study answered the following questions:

- 1) Are the mothers have enough knowledge regarding shaken baby syndrome hazards?
- 2) Are the mothers have appropriate believes and attitudes regarding shaken baby syndrome hazards?
- 3) Is there a relation between socio-demographic characteristics and mothers' knowledge?
- 4) Is there a relation between socio-demographic characteristics and mothers' believes and attitudes?

### Research Design

An exploratory descriptive research design was used to achieve the aim of the present study and answer the research questions.

### Setting

This study was conducted at inpatient and outpatient pediatric department at Minia university hospital for obstetric and pediatric. The hospital serves Minia governorate and its districts.

### Sample

A convenient sample of 384 of mothers calculated according to Total number of mothers who admitted to outpatient and inpatient pediatric department at El Minia university hospital for obstetric and pediatric (MUHOP), obtained from registers in January 2018 was 10459 mothers, and according to inclusion criteria. The required sample size was estimated based on the following formula (Cochran formula, 1963; Kasiulevičius. et al., 2006):

$$n = Z^2 \frac{P(1-P)}{e^2}$$

Where; n=the desired sample.

- Value of Z: obtained from statistical tables corresponding to 95% confidence interval, this equal to (1.96)
- e =degree of precision usually set at 0.05
- P is the expected prevalence of mothers' knowledge, believes and attitudes regarding shaken baby syndrome hazards .Assuming it to be 50 % (Holla et al., 2014).

$$n = \frac{(1.96)^2 \times 0.5 (0.5)}{0.0025} = 384$$

Accordingly, the sample size needed was (384).

### Inclusion Criteria

- Mothers have normal newborn infant

### Exclusion Criteria:-

- Mothers who have child more than 1 year.
- Mothers who have infant with chronic illness or congenital anomaly.

### Data collection tools:-

Two tools were used for this study which were:-

#### Tool (1)

**Part ( I ): Socio-demographic data of mothers** such as: age, number of children, residence, educational level, etc. (Abd Al -Twaab, 2004)

**Part (II): Predesigned questionnaire** to assess shaken baby syndrome hazards knowledge, a qualitative questions developed by (Waltz-Feher et al., 2005), were used to create five option multiple choice questions (19 questions ), for which one response was correct and there were some questions have more than one correct answer. A written multiple-choice test was chosen because this type of test is most cognitively objective and the most reliable such as: Shaken baby syndrome is? , At what age are children at risk for being shaken? How long does it take to shake a baby? etc. The total score 50% and more was considered as satisfied level

of knowledge and less than 50% was considered unsatisfied level of knowledge.

**Tool (2) Likert Scale** included 15 items that measure mothers' beliefs and attitudes regarding shaken baby syndrome hazards, mothers was asked to rank the appropriateness of a soothing or discipline practice. Answers were coded on a scale where 0 = risk indicated; 1 = ambiguous; 2 = appropriate, if total score of answers more than 18 grades (>60%), this is considered appropriate mothers' beliefs and attitudes, and if total score of answers less than 18 grades (<60%) this is considered inappropriate mothers' beliefs and attitudes. (Dias et al., 2005).

### Content Validity

The tools were translated into Arabic language by the researcher and the content validity of the data collection tools was reviewed by five panels of experts in pediatric nursing to test the content validity of the tools, and based on their recommendations, the necessary modifications were performed for their content coverage, clarity, wording length, format and overall appearance.

### Reliability

Internal consistency was measured to identify the extent to which the items of tools measure the same concept and the extent to which the items are correlated with each other. Reliability of mother's knowledge tool and mother's beliefs and attitudes tool by **Cronbach's Alpha coefficient** was 0.590 and 0.464 respectively.

### Pilot Study

Pilot study was conducted on 39 mothers having newborn infant (10%) who met the inclusion criteria to investigate and ensure the feasibility, objectivity, applicability, clarity and adequacy of the study tools and to determine possible problems in the methodological approach or tool. The results of the pilot study used to test the proposed statistical and data analysis methods. The tools were completed without difficulty, adding support to the validity of the instrument. The time needed to complete the tool was according to the needed explanation. No modifications were done in the study tools based on the pilot study. The study subjects was included the total study sample.

### Data Collection procedure:-

Administrative approval was obtained from the Dean of Faculty of Nursing, Minia University to the manager of

hospital before implementation of the study. Meeting was done with hospital manager to explain the objectives of the study and gained their cooperation and allowed meeting with the mothers. The written consent was taken from all mothers participate in the study. The purpose and nature of the study was explained by the researcher through direct personal communication prior to starting their participation in the study, a structured interview was conducted in inpatient and outpatient pediatric department reciprocally, and questions were asked and recorded by the researcher. Measures were taken to protect mothers' ethical rights. Data were collected by using a socio-demographic data sheet, predesigned questionnaire to assess shaken baby syndrome knowledge and of 15 items that measure mothers' beliefs and attitudes regarding shaken baby syndrome hazards. The researcher was available at the inpatient and outpatient department according to available days and time. The researcher had interviews with the mothers' of newborn –infant and collected data from them; the time of interview depending on the degree of understanding and responses of the respondent. Data collection was conducted over a six months' period extending from August 2018 till February 2019.

Each mother of newborn-infant was interviewed individually, after explaining the purpose of the interview and getting agreement of the mother to participate in the research. The investigator assured the voluntary participation and confidentiality to each subject who agreed to participate. The questionnaires were read, explained to the studied sample within average of 30 minutes and the responses were recorded by the investigator for eliminating the systematic error and for more validation of the mother's information.

### Ethical Consideration:

A written initial approval was obtained from the research ethical committee of the faculty of nursing, Minia University. Written consent was obtained from the mothers who will participate in this study. Each assessment sheet was coded and mother's name wasn't appearing on the sheets in the purpose of anonymity and confidentiality. The mothers were assured that they could withdraw at any time from the current study without any effect on their newborn-infants' treatment and care.

### Statistical Analysis:

The collected data were coded, categorized, tabulated, and analyzed using the Statistical Package for the Social Science (SPSS Version 20), graphics by excel.

## Results

**Table (1.a): Distribution of the studied mothers' knowledge regarding shaken baby syndrome hazards. (No =384)**

Data	No	%
<b>1-Shaken baby syndrome is :</b>		
• Don't know	154	40.1%
• Caused by birth or genetic disorders	44	11.5%
• A form of child abuse that is preventable through education	88	22.9%
• A pre-existing medical condition or disease	41	10.7%
• Other answer	57	14.8%
<b>2-At any age are children at risk for being shaken?</b>		
• I don't know	50	13%
• From birth until 2 year old	296	77.1%
• 4 years old	20	5.2%
• More than 6 years old	8	2.1%
• Other answer	10	2.6%
<b>3- Which of the following statements are true?</b>		
• Don't know	211	54.9%

Data	No	%
• Shaken baby syndrome is a disease	80	20.8%
• Most of shaken babies die from their injuries	72	18.8%
• Most victims are over the age of 5	5	1.3%
• Other answer	16	4.2%
<b>4- How long does it take to shake a baby?</b>		
• Don't know	83	21.6%
• Few seconds	67	17.4%
• Four minutes	84	21.9%
• Five minutes	101	26.3%
• Other answer	49	12.8%
<b>5- Why is a baby so easily hurt?</b>		
• Don't know	85	22.1%
• Because they have strong neck muscles	11	2.9%
• Because they are able to tell us what they need	29	7.6%
• They have a heavy head	220	57.3%
• Other answer	39	10.2%
<b>6-What can happen to a baby or young child when it is shaken?</b>		
• Don't know	159	41.4%
• Bleeding behind the eyes, blindness	97	25.3%
• Paralysis from bleeding around the brain and or learning disabilities	47	12.2%
• Sudden death	29	7.6%
• Other answer	52	13.5%

**Table (1.a)** shows the distribution of studied mothers' knowledge regarding shaken baby syndrome hazards. It was noticed that 40.1% don't know what is the meaning of Shaken baby syndrome, high percentage of participant mothers 77.1% reported that the age are children at risk for being shaken from birth until 2 year old . Above the half of participant mothers 54.9% don't know the true statement that describe shaken baby syndrome and 57.3% reported that the baby is so easily hurt because of they have a heavy head .

**Table (1.b): Distribution of the studied mothers' knowledge regarding shaken baby syndrome hazards. (No =384)**

Data	No	%
<b>7-What might you see to be a sign that a baby or young child has been shaken?</b>		
• Don't know	65	16.9%
• Rolling eyes and convulsions	77	20.1%
• Vomiting	207	53.9%
• Difficulty breathing	13	3.4%
• Other answer	22	5.7%
<b>8-Is there a situation that makes shaking a baby or young child OK?</b>		
• Don't know	35	9.1%
• Yes	166	43.2%
• No	67	17.4%
• While playing	101	26.3%
• Other answer	15	3.9%
<b>9-Even though mothers are typically the main caregivers, why are fathers or male partners more likely to shake a baby or young child?</b>		
• Don't know	55	14.3%
• Men may be used to a baby's or young child's crying	39	10.2%
• Men may be more familiar with a baby's or young child's needs	38	9.9%
• Men may have additional stresses, such as financial or family stresses	226	58.9%
• Other answer	26	6.8%
<b>10-Can a baby or young child becomes a victim of SBS while in the care of a babysitter or a day care provider?</b>		
• Don't know	90	23.4%
• Any caregiver is at risk of shaking a baby or young child	97	25.3%
• A baby or young child is only at risk of shaking while with someone they do not know	121	31.5%
• A baby or young child is at risk of shaking while with the parent or relative	61	15.9%
• Other answer	15	3.9%
<b>11-Who do you think is more patient with a baby or young child the parents or someone babysitting the child?</b>		
• Don't know	49	12.8%
• Both types of caregivers are equally at risk for shaking a baby or young child.	96	25.0%
• Parents can become stressed from the day in and day out care and are at more risk for shaking their child	136	34.4%
• Babysitters are more at risk for shaking a child as they not always be able to have the patience that a parent may have.	76	19.8%
• Other answer	27	7.1%

**Table (1.b)** illustrates the distribution of studied mothers' knowledge regarding shaken baby syndrome hazards. It was reported that above the half of the participant mothers 53.9% see the vomiting as a sign that a baby or young child has been shaken. Also it was noticed that 58.9% of mothers see the fathers or male partners more likely to shake a baby or young child as the men may have additional stresses, such as financial or family stresses.

Table (1.c): Distribution of the studied mothers' knowledge about reasons and prevention of shaken baby syndrome. (No =384)

Data	No	%
<b>12- The first reason trigger why someone shakes a child is:</b>		
• Don't know	22	5.7%
• Sleeping	62	16.1%
• Laughing	39	10.2%
• Crying	259	67.4%
• Other answer	2	0.5%
<b>13- What is the most common reason that babies cry?</b>		
• Don't know	18	4.7%
• The baby or young child is hungry	254	66.1%
• The baby or young child needs a diaper change	43	11.2%
• The baby or young child is tired	61	15.9%
• Other answer	8	2.1%
<b>14-What are some things a person can do to avoid shaking a baby or young child?</b>		
• Don't know	70	18.2%
• Give the baby to one of the relatives	159	41.4%
• Call a friend, neighbor or relative to talk, or to relieve you for a few minutes	47	12.2%
• Remind yourself the crying will end and there is needless for shaking	69	18.0%
• Other answer	39	10.2%
<b>15-Anyone who may become frustrated is capable of shaking a baby.</b>		
• Don't know	53	13.8%
• Is a false statement	149	38.8%
• Is sometimes true	113	29.4%
• Is true	63	16.4%
• Other answer	6	1.6%
<b>16-According to your point of view, Shaken baby syndrome is considered</b>		
• Don't know	184	47.9%
• A Preventable tragedy	126	32.8%
• An assault on a child	36	9.4%
• Often ruled homicide	21	5.5%
• Other answer	17	4.4%
<b>17-Is Shaken Baby Syndrome Preventable?</b>		
• Don't know	31	8.1%
• Sometimes	121	31.5%
• Never	15	3.9%
• Yes, through education	215	56.0%
• Other answer	2	0.5%
<b>18-Activities that do not cause shaken baby syndrome</b>		
• Don't know	121	31.5%
• The baby falling off furniture or a counter	64	16.7%
• The baby being tossed up and caught	32	8.3%
• The baby being bounced on an adult's knee	157	40.9%
• Other answer	10	2.6%

Table (1.c) shows the distribution of the studied mothers' knowledge about reasons and prevention of shaken baby syndrome. It was reported that (67.4%) of participant mothers see that the first reason trigger why someone shakes a child is the crying. Above the two thirds of participant mothers (66.1%) reported that the most common reason that babies cry is the baby or young child is hungry and it was reported that 56.0% of participant mothers said that Shaken Baby Syndrome Preventable through education.

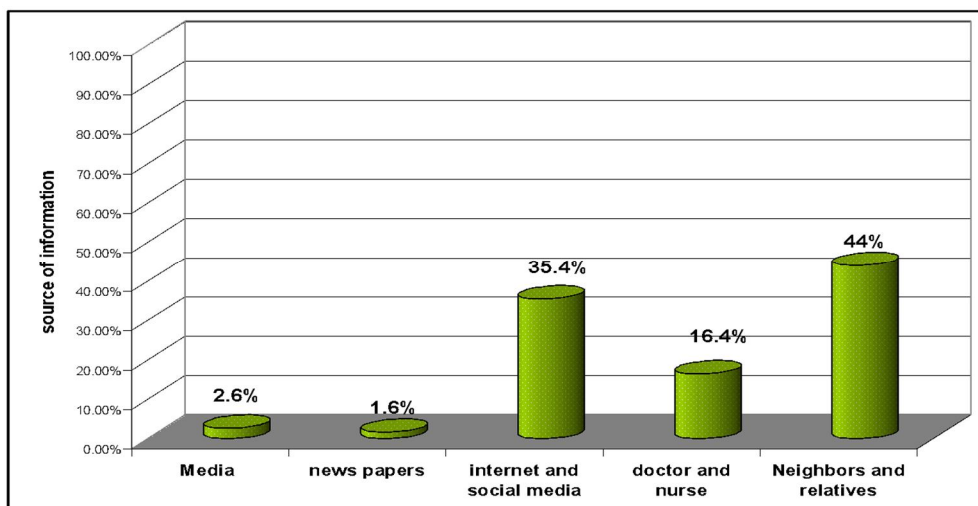


Figure (1) source of mothers' information regarding shaken baby syndrome hazards

Figure (1) represents the source of mothers' knowledge regarding shaken baby syndrome hazards. The nearly half of mothers get their information from neighbors and relative 44%.

Table (2): Distribution of total score of the studied mothers' knowledge regarding shaken baby syndrome hazards.

knowledge level	No	%
• Unsatisfactory	292	76.0%
• Satisfactory	92	24.0%
<b>Total</b>	<b>384</b>	<b>100%</b>

Table (2) shows distribution of the total score of mothers' knowledge regarding shaken baby syndrome hazards. It was reported that high percentages of mothers' knowledge regarding shaken baby syndrome hazards is unsatisfactory 76.0%.

Part III, Table (3.a): Distribution of the studied mothers' believes and attitudes regarding shaken baby syndrome hazards. (No =384)

Data	No	%
<b>1-Hitting or striking is an appropriate way to discipline babies</b>		
• Appropriate	32	8.3%
• Ambiguous	40	10.4%
• risk indicated	<b>312</b>	<b>81.3%</b>
<b>2-Spanking is an appropriate way to discipline babies</b>		
• appropriate	39	10.2%
• ambiguous	53	13.8%
• risk indicated	<b>292</b>	<b>76.0%</b>
<b>3-Shaking is an appropriate way to calm babies</b>		
• appropriate	<b>175</b>	<b>45.6%</b>
• ambiguous	85	22.1%
• risk indicate	124	32.3%
<b>4- Feeding is an appropriate way to calm babies</b>		
• risk indicated	13	3.4%
• ambiguous	55	14.3%
• appropriate	<b>316</b>	<b>82.3%</b>
<b>5-Walking while holding a baby is an appropriate way to calm babies</b>		
• risk indicated	16	4.2%
• ambiguous	39	10.2%
• appropriate	<b>329</b>	<b>85.7%</b>
<b>6-Holding is an appropriate way to calm babies</b>		
• risk indicated	31	8.1%
• ambiguous	56	14.6%
• appropriate	<b>297</b>	<b>77.3%</b>
<b>7- Singing is an appropriate way to calm babies</b>		
• risk indicated	16	4.2%
• ambiguous	46	12.0%
• appropriate	<b>322</b>	<b>83.9%</b>
<b>8-Talking is an appropriate way to calm babies</b>		
• risk indicated	20	5.2%
• ambiguous	65	16.9%
• appropriate	<b>299</b>	<b>77.9%</b>
<b>9-Rocking in a rocking chair is an appropriate</b>		
• risk indicated	49	12.8%
• ambiguous	133	34.6%
• appropriate	<b>202</b>	<b>52.6%</b>
<b>10-When calming an upset baby, there is a possibility the baby may get hurt when caregivers hold them</b>		
• risk indicated	57	14.8%
• ambiguous	<b>205</b>	<b>53.4%</b>
• appropriate	122	31.8%
Total	384	100%

Table (3.a) shows distribution of the studied mothers' attitudes and believes regarding shaken baby syndrome hazards. It was noticed that 81.3% believed that hitting or striking is an appropriate way to discipline babies is risk indicated, Also it was noticed that 76.0% of participant mothers believed that spanking as a way to discipline babies is risk indicated. It was reported that 45.6% believed that Shaking is an appropriate way to calm babies. Also it was noticed that high percentage of mothers believed the appropriate ways to calm baby are feeding, walking while holding a baby, holding a baby, singing and talking (82.3% ,85.7%,77.3%,83.9% and 77.9% respectively).Above the half of participant mothers believed that rocking in a rocking chair as a way to calm babies is ambiguous 52.6% , and 53.4% of participant mothers believed that when calming an upset baby, there is a possibility the baby may get hurt when caregivers hold them is ambiguous.



**Table (3.b): Distribution of the studied mothers' believes and attitudes regarding shaken baby syndrome hazards. (No =384)**

Data	No	%
<b>11-Caregivers who are frustrated or stressed can respond to an upset baby appropriately</b>		
• appropriate	83	21.6%
• ambiguous	<b>192</b>	<b>50.0%</b>
• risk indicated	109	28.4%
<b>12-Caregivers who are angry can respond to an upset baby appropriately</b>		
• appropriate	81	21.1%
• ambiguous	<b>183</b>	<b>47.7%</b>
• risk indicated	120	31.3%
<b>13-One important role for parents is to protect their infant by making sure people who take care of their infant know about the dangers of shaking an infant.</b>		
• risk indicated	21	5.5%
• ambiguous	121	31.5%
• appropriate	<b>242</b>	<b>63.0%</b>
<b>14-Shaking an infant can cause serious health problems or even death.</b>		
• risk indicated	73	19.0%
• ambiguous	152	39.6%
• appropriate	<b>159</b>	<b>41.4%</b>
<b>15- Baby may die from crying ,so he should be shaken roughly to stop crying</b>		
• appropriate	84	21.9%
• ambiguous	134	34.9%
• risk indicated	<b>166</b>	<b>43.3%</b>
<b>Total</b>	<b>384</b>	<b>100%</b>

Table (3.b) shows distribution of the studied mothers' attitudes and believes regarding shaken baby syndrome 50.0% of participant mothers believed that caregivers who are frustrated or stressed can respond to an upset baby appropriately is ambiguous, Also it was noticed that 47.7% of participant mothers believed that caregivers who are angry can respond to an upset baby appropriately is ambiguous ,63.0% of participant mothers believed that one important role for parents is to protect their infant by making sure people who take care of their infant know about the dangers of shaking an infant is appropriate. It was report that 41.4% believed that shaking an infant can cause serious health problems or even death is appropriate. Also it was reported that 43.3% believed that baby may die from crying so he should be shaken roughly to stop crying is risk indicated.

**Table (4): Distribution of the studied mothers' total score of believes and attitudes regarding shaken baby syndrome hazards. (No =384)**

Believes and attitudes level	No	%
• Inappropriate	353	<b>91.9%</b>
• Appropriate	31	8.1%
<b>Total</b>	<b>384</b>	<b>100%</b>

Table (4) illustrates distribution of the studied mothers' total score of believes and attitudes regarding shaken baby syndrome hazards, it was noticed that 91.9 of the mothers participated in the study have inappropriate attitudes and believes regarding shaken baby syndrome hazards.

**Table (5): Relation between total score of the studied mothers' knowledge, believes and attitudes regarding shaken baby syndrome hazards**

Total score of believes and attitudes	Total score of knowledge				P
	Unsatisfactory N=292		Satisfactory N=92		
	No.	%	No.	%	
• Inappropriate	278	(95.2%)	75	(81.5%)	0.001*
• Appropriate	14	(4.8%)	17	(18.5%)	

\*Statistically Significant Difference

Table (5) illustrates the relation between total score of the studied mothers' knowledge and attitudes and believes regarding shaken baby syndrome hazards. It was reported that appositve relation between knowledge level and attitudes and believes score where the studied mothers with higher in appropriate attitudes and believes score regarding shaken baby syndrome hazards have unsatisfactory knowledge regarding shaken baby syndrome hazards with statistically significant difference (P 0.001).

**Table (6): Relation between demographic data of the studied mothers and their knowledge regarding shaken baby syndrome hazards.**

Demographic data	Knowledge level				P
	Unsatisfactory N=292		Satisfactory N=92		
	No.	%	No.	%	
<b>Age</b>					
• Less than 20 year	26	(8.9%)	4	(4.3%)	0.09
• 20-<25 year	<b>108</b>	<b>(37%)</b>	<b>25</b>	<b>(27.2%)</b>	
• 25-<30 year	96	(32.9%)	40	(43.5%)	
• More than 30 year	62	(21.2%)	23	(25%)	
<b>Residence</b>					
• Rural	<b>231</b>	<b>(79.1%)</b>	<b>63</b>	<b>(68.5%)</b>	0.03*
• Urban	61	(20.9%)	29	(31.5%)	

Demographic data	Knowledge level				P
	Unsatisfactory N=292		Satisfactory N=92		
	No.	%	No.	%	
<b>Number of siblings</b>					0.03*
• One	76	(26%) n	15	(16.3%)	
• Two	<b>85</b>	<b>(29.1%)</b>	<b>41</b>	<b>(44.6%)</b>	
• Three	75	(25.7%)	19	(20.7%)	
• More	56	(19.2%)	17	(18.5%)	

**\*Statistically Significant Difference**

**Table (6)** describes the relation of demographic data of the studied mothers and their knowledge regarding shaken baby syndrome hazards. It was noticed that there was positive relation between mothers' age and knowledge level, where the highest satisfactory knowledge level of mothers in average age (25-<30 years) (**P0.09**). Most of mothers participated in the study from rural area with unsatisfactory knowledge level 79.1%, so it was appositive relation between residence of the mothers and their knowledge level regarding shaken baby syndrome hazards with statistically significant difference (**P0.03**) .it was described that the most of participated mothers have two siblings for the baby, they had high satisfactory knowledge level 44.6%, so there was a negative relation between number of children and knowledge level regarding shaken baby syndrome with statistically significant difference (**P 0.03**).

**Table (7) Relation between the studied mothers' socioeconomic status and their knowledge regarding shaken baby syndrome hazards**

-Socioeconomic status	Knowledge				P
	Unsatisfactory N=292		Satisfactory N=92		
	No.	%	No.	%	
• Low	48	(16.4%)	15	(16.3%)	0.001*
• Moderate	<b>203</b>	<b>(69.5%)</b>	<b>45</b>	<b>(48.9%)</b>	
• high	41	(14%)	32	(34.8%)	

**\* Statistically Significant Difference**

**Table (7)** shows the relation between the studied mothers' socioeconomic status and their knowledge regarding shaken baby syndrome hazards, there was a statistically significant relation socioeconomic status and knowledge level regarding shaken baby syndrome hazards with statistically significant difference (**P 0.001**), that the family with moderate socioeconomic status 69.5% had unsatisfactory knowledge level and family with high socioeconomic status 34.8%, had satisfactory level of knowledge.

**Table (8): Relation between of the studied mothers' demographic data, believes and attitudes regarding shaken baby syndrome hazards**

Demographic data	Believes and attitudes				P
	In appropriate N=353		appropriate N=31		
	No.	%	No.	%	
<b>Age</b>					0.3
• Less than 20 year	29	(8.2%)	1	(3.2%)	
• 20-<25 year	123	(34.8%)	10	(32.3%)	
• 25-<30 year	<b>121</b>	<b>(34.3%)</b>	<b>15</b>	<b>(48.4%)</b>	
• More than 30 year	80	(22.7%)	5	(16.1%)	
<b>Residence</b>					0.4
• Rural	272	(77.1%)	22	(21%)	
• Urban	81	(22.9%)	9	(29%)	
<b>Number of sibling</b>					0.1
• One	80	(22.7%)	11	(35.5%)	
• Two	115	(32.6%)	11	(35.5%)	
• Three	87	(24.6%)	7	(22.6%)	
• More	71	(20.1%)	2	(6.2%)	

**\* Statistically Significant Difference**

**Table (8)** shows relation between of the studied mothers' demographic data, believes and attitudes regarding shaken baby syndrome hazards. It illustrated that 34.3%, of the mothers participated in the study within the age group ranged (25-<30) years had inappropriate believes and attitudes regarding shaken baby syndrome hazards (**P 0.3**). It was noticed that 77.1% of the mothers participated in the study from rural area had inappropriate believes and attitudes regarding shaken baby syndrome hazards (**P0.4**). No statistically significant differences were found between demographic data of the studied mothers and their attitudes and believes regarding shaken baby syndrome hazards

**Table (9): Relation between the studied mothers' socioeconomic status, attitudes and believes regarding shaken baby syndrome hazards**

-Socioeconomic status	Believes and attitudes				P
	Inappropriate N=353		appropriate N=31		
	No.	%	No.	%	
• Low	71	(17.3%)	2	(6.5%)	0.1
• Moderate	<b>228</b>	<b>(64.6%)</b>	<b>20</b>	<b>(64.5%)</b>	
• High	64	(18.1%)	9	(29%)	



**Table (9) Table (12)** shows relation between the studied mothers' socioeconomic status, believes and attitudes regarding shaken baby syndrome hazards. It was reported that there was no statistically significant relation between socioeconomic status, believes and attitudes regarding shaken baby syndrome hazards with statistically significant difference (**P0.1**).

## Discussion

The aim of this study was to assess mothers' Knowledge, believes and attitudes regarding shaken baby syndrome hazards. Results of this study included socio-demographic data of the studied sample. In addition, the relations between socio-demographic data of the studied sample regarding dependent variables

### As for studied mothers' knowledge regarding shaken baby syndrome hazards

The present study revealed that mothers' knowledge regarding shaken baby syndrome hazards, it was noticed that 40.1% don't know what is the meaning of Shaken baby syndrome, This may be due to the mothers generally do the technique of shaken , many of them do not perceive shaking to be as harmful act, which result in Shaken baby syndrome, more than three quarter of participant mothers 77.1% reported that the age of children at risk for being shaken from birth until 2 year old, may be due to in such stage of growth and development the main way baby communicate , capture attention, express his needs by crying and the most common normal reasons baby cry :hunger , colic, need to burp ,need to sleep ,dirty diaper , illness or infection so the Infant crying can be a frustrating issue for parent and caregivers who may not understand that crying is a normal development stage in newborn-infant stage .

Above the half of participant mothers 54.9% reported don't know the true statement that describe shaken baby syndrome, which may due to that regarding to the mothers shaken is just technique they do to calm their babies doesn't reach to being a disease or the babies die from it. And above the half of participant mothers 57.3% reported that the baby is so easily hurt because of they have a heavy head, may be due to a large head in proportion to their body, and a brain that has not yet well developed.

Results of the current study were in accordance with findings of a study conducted by (Bechtel et al., 2011), which assessed parental understanding of SBS and identify knowledge gaps. A prospective assessment was carried out in two independent maternity hospitals and founded that half of all participants had no prior knowledge about the meaning of shaken baby syndrome, with majority expressing interest in learning more. Therefore, a national "Don't Shake" campaign is evolving. Also babies are vulnerable to injury from shaking because they have weak neck muscles, a large head in proportion to their body, and a brain that has not yet developed myelin, which is protective, toughening layer of protein. Consequently, when babies are shaken, the gelatin-like brain knocks back and forth inside the still-roomy skull, incurring serious damage. SBS most frequently occurs during the first year of life, although children can be seriously hurt at any age. Also on the same line with one international study (Rnyan et al., 2010), who found that the prevalence of shaking infant one year of age or younger was between 20% to 63% in 9 of 16 communities in Brazil ,Chile , Egypt ,India, and the Philippines .

The present study reported that, above the half of the participant mothers 53.9% think that they may see the vomiting as a sign that a baby or young child has been shaken

which may be due to when the baby cry they try to calm him with feeding and when he doesn't stop crying, they become frustrated and shake him which may cause stomach upset and result in vomiting and scientifically, When a baby is violently shaken, brain cells are destroyed and the brain cannot get enough oxygen. As a result, a victim of shaken baby syndrome may show many signs one of them is vomiting, also it was noticed that 58.9% reported that even though mothers are typically the main caregivers, fathers or male partners more likely to shake a baby or young child as the men may have additional stresses, such as financial or family stresses or as a type of play or cuddling of the baby

On the same line, Studies have found that caretakers (fathers and mothers) are the most likely culprits and less frequently baby-sitters. (Altman et al., 2011).

The present study showed that (67.4%) of participant mothers reported that, the first reason trigger why someone shakes a child is the crying, that may be due to that crying does not hurt infants, but getting frustrated with crying can lead one to shake the baby and inconsolable or excessive crying is the most common trigger for shaking a baby, above the half of participant mothers (66.1%) reported that the most common reason that babies cry is the baby or young child is hungry, this may be due to parent think that babies cry to tell us they are hungry, or the baby in the first years of life usually express his need for feeding through crying. Also it was reported that above the half of participant mothers (56.0%) see that shaken baby syndrome is preventable through education, may be due to the parents don't intended that hurt their babies so when they were educated about shaken baby syndrome hazards , they could prevent it .Also the current study represented the source of mothers' information regarding shaken baby syndrome hazards and 44% of participant mothers get their information from neighbors and relatives, that may be due to the most of the mothers participated in the study were from rural area where the effect on each other's and mother prefers to obtain the information and advice from her neighbors and relatives .

Results of the current study were in accordance with a study was conducted by (Cook et al., 2016), who deduced that almost of parent's perceived the crying as a problem is the most common risk factor for SBS, Also on the same line with findings of a study by (Barr et al ., 2014),where the mothers were asked about the reasons for babies crying and soothing methods, the most answers were he/she may be hungry and however and 25-50% of parents and caregivers do not know the consequences of shaking a baby due to the devastating consequences of shaking an infant and also reported that SBS education for parents and caregivers is greatly needed to increase awareness of shaken baby syndrome and decrease the incidence of SBS .

The result of current study is in contrast with those by (Brooke, 2011) who reported that mothers' understanding of the syndrome based on information they had learned during their training and through the media and the parents' social network are the most important sources of information. Furthermore, such sociocultural influences appear to shape knowledge more powerfully

The present study revealed that total score of the studied mothers' knowledge regarding shaken baby syndrome hazards. It was reported that high percentage of mothers' knowledge regarding shaken baby syndrome hazards is unsatisfactory 76.0%. That may be due to the mothers do the technique of SBS, but they don't aware that is harmful act and has assigns a hazards which can lead to infant death and may be due to that the studied mothers were from rural area and most of them are housewives with low socioeconomic status

This finding is on the same line with those obtained by (Alshahrani et al., 2018) study who reported that 67.39 % of mothers participated in the study had no idea about the risks of shaken the baby during the 1<sup>st</sup> year of life. Moreover, about 70% of them reported that they have never heard about what is called SBS. Also agreed with a study by (Brooke, 2011) , which reported that all mothers were asked if they knew about SBS, (9.5%) answered that they had already heard about SBS but more than 90 % were unaware of such a syndrome.

#### **As for the studied mothers' believes and attitudes regarding shaken baby syndrome hazards.**

The present study showed that 81.3% participant mothers believed that hitting or striking is an appropriate way to discipline babies is risk indicated, , Also it was noticed that 76.0% of participant mothers believed that spanking to discipline babies is risk indicated, it may be due the injury which may result from hitting ,striking or spanking . This study was in contrast with a study of (Beth and Preston, 2014), who reported that the mothers had harsh care giving responses as they reported that hitting, striking or spanking is an appropriate way to calm the babies

The present study found that 45.6% of participant mothers believed that shaking is an appropriate way to calm babies and 52.6% of them believed that rocking in a rocking chair is an appropriate way to calm the babies, that may due to they believe and do the shaken as an effective way to calm their babies and don't know the hazards which may result from shaken the baby. In this point finding of this study is on the same line with a study of (Beth and Preston, 2014), which reported that the mothers had negative attitudes and believes as they response that shaking is an appropriate way to calm babies and had appropriate soothing response that rocking in a rocking chair is an appropriate way to calm the babies.

Also it was noticed that high percentage of mothers believed the appropriate ways to calm baby are feeding, walking while holding a baby, holding a baby, singing and talking (82.3% ,85.7%,77.3%,83.9% and 77.9% respectively). These may be due to baby crying or upset caused by hunger or need of smooth soothing. Results of this study are on the same line with those obtained by (Beth and Preston, 2014), who reported that the mothers had an appropriate soothing response that feeding ,walking while holding a baby and singing are an appropriate way to calm babies .

Also it was noticed that 53.4% of participant mothers believed that when calming an upset baby, there is a possibility the baby may get hurt when caregivers hold them is ambiguous, 50.0% of participant mothers believed that caregivers who are frustrated or stressed can respond to an upset baby appropriately is ambiguous .Also it was noticed that 47.7% of participant mothers believed that caregivers who are angry can respond to an upset baby appropriately is ambiguous ,that may be due to crying or upset baby causing anger of the mothers and they may hold them for soothing or

loss of control on their emotions and result in frustration of mothers and harm the baby , so it's ambiguous belief and attitude based on mother's control of her feelings and behavior

Findings of this study are in contrast with results of a study conducted by (Beth and Preston, 2014), who illustrated that mothers believed and had attitudes that holding is an appropriate way to calm babies, when calming an upset baby, there is a possibility the baby may get hurt when caregivers hold them is harmful soothing, and caregivers who are frustrated, stressed or anger can respond to an upset baby appropriately is risk indicated.

The present study showed that 63.0% of mothers believed that one important role for parents is to protect their infant by making sure people who take care of their infant know about the dangers of shaking an infant is appropriate. Also it was reported that 41.4% of them believed and had an attitude that shaking an infant can cause serious health problems or even death is appropriate , it may be due to parents are not only the care givers of the baby so if they know anything may harm the baby they also inform who share them the baby care and also it was reported that 43.3% of them believed and had an attitude that baby may die from crying, so he should be shaken roughly to stop crying is risk indicated, may be due to if the mothers understand the needs of the baby, they will control the baby crying without any harm than shaken roughly to stop crying. Results of this study are in contrast with those obtained by (Lazoritz and Palusci, 2014) study which reported that the mothers violence shook the infants in their care in order to stop a cry and believed shaken is a harmless play.

The present study showed that 91.9% of mothers participated in the study had inappropriate attitudes and believes regarding shaken baby syndrome hazards. This may be due to as showed previously that the mothers had unsatisfactory level of knowledge regarding shaken baby syndrome hazards, so it was expected inappropriate believes and attitudes as any person built the believes and tissue the attitudes on the knowledge. Findings of this study are on the same line with study of (Beth and Preston, 2014), which reported that the majority of American mothers included in the sample had harsh and inappropriate attitudes and believes about shaken baby syndrome, also agree with findings obtained in a study by (Alshahrani et al., 2018), which reported that majority of parents had inappropriate attitudes regarding shaken baby syndrome and not understood the connection of shaking with risks on the child's life during the 1st year and thereafter.

#### **As regard to the relation between total score of the studied mothers' knowledge and attitudes and believes regarding shaken baby syndrome hazards.**

The present study illustrated the relation between total score of the mothers' knowledge and attitudes and believes regarding shaken baby syndrome hazards. It was reported that a positive relation between knowledge level , attitudes and believes score where the higher inappropriate attitudes and believes score regarding shaken baby syndrome hazards with unsatisfactory knowledge regarding shaken baby syndrome hazards, it may be due to the mothers deal and nurture their babies according to what they know and learn about baby care and how handle the baby needs and problems, so if the mothers don't have enough and accurate knowledge

about shaken baby syndrome, they believe and deal inappropriately with the baby.

This study is in agreement with the study by (Alshahrani et al., 2018), which concluded that perception, knowledge and attitudes towards SBS must be addressed by applying shaken baby syndrome educational and prevention programs, and with study of (Denise, 2017) which reported that training using the SBS prevention program was useful for mothers; their level of knowledge about the dangers of shaking increased. Education given prior to the birth and three to seven days after the birth was found to be more useful to improve the mothers' beliefs and behavior to prevent shaken baby syndrome.

Also on the same line with a study by (Yuma et al., 2013), which reported that resilience is the ability to gain the knowledge and handle everyday stressors and recover from occasional crises. Parents who are emotionally resilient have a positive attitude, creatively solve problems, effectively address challenges, and are less likely to direct anger and frustration at their children. In addition, these parents are aware of their own challenges. So the good preparation of parents and providing them with satisfied knowledge and counseling regarding shaken baby syndrome and its risks, result in safe and appropriate attitude toward their children.

#### **As regard to the relation between demographic data of participant mothers and their knowledge, beliefs and attitudes regarding shaken baby syndrome hazards.**

The present study described the relation between demographic data of participant mothers and their knowledge, beliefs and attitudes regarding shaken baby syndrome hazards. It was noticed that there was positive relation between mothers' age and knowledge, beliefs and attitudes, where the highest satisfactory knowledge level and appropriate beliefs and attitudes of mothers in the age group (25-30 years). The most of mothers participated in the study from rural area with unsatisfactory knowledge level 79.1% and inappropriate beliefs and attitudes (77.1%), so it was a positive relation between residence of the mothers and their knowledge, beliefs and attitudes regarding shaken baby syndrome hazards.

That may be due to in the early marriage the mothers not prepared enough to care of the baby and it's expected to have low knowledge level not only regarding shaken baby syndrome but also any topic related to infant care and discipline and in remote and rural areas has lack of information source and most common mother's source of information as mentioned previously in this study from relatives and neighbors whose information may be just traditions and not more accurate.

The present study findings are at the same line with those found in a study by (Alshahrani et al., 2018), which showed that the most of participant mothers from rural provinces with a subsistence life, were below the age of 40 (20-30 years). Regarding the knowledge and attitude about SBS, above the half of mothers reported that, shaking the baby to make them quiet within the 1st year of life, and they had no idea about the risks of shaking the baby during the 1st year of life. Moreover, about 70% of them reported that they have never heard about what is called SBS and they had negative attitude regarding SBS and its risks. But it in contrast with a study of (Beth and Preston, 2014), which reported that no significant relation between demographic characteristics of parent and knowledge and attitude about SBS.

#### **As regard to the relation between the studied mothers' socioeconomic status, knowledge, beliefs and attitudes regarding shaken baby syndrome hazards**

The present study showed that there is a statistically significant relation between socioeconomic status and mothers' knowledge regarding shaken baby syndrome hazards, where the families with moderate socioeconomic status were 69.5% had unsatisfactory knowledge level and families with high socioeconomic status were 34.5% had satisfactory level of knowledge regarding shaken baby syndrome hazards, but there wasn't a statistically significant relation between the studied mothers' socioeconomic status, beliefs and attitudes regarding shaken baby syndrome hazards. This may be due to poverty and lack of income, increase family burden and stress which may decrease their emotional control in dealing with the baby and limit their sources of knowledge.

The present study findings are on the same line with those found in a study conducted by (Department of Community Based Services (DCBS), 2013) which uncovered the most common risk factors that appeared to increase an infant's risk of being shaken, particularly when combined with a parent or caregiver who is not prepared to cope with caring for a baby is the poverty. Also reinforced by (Ward et al., 2016) study, which showed that the vast majority of shaken baby syndrome prevention programs investigated is developed and applied in developed countries, and, therefore, may not have the same applicability and the same results when carried out in developing countries. Furthermore, the cost of dealing with the consequences of child abuse has an even more significant impact on developing countries, since such countries face higher rates of child abuse, as well as other systemic and equally serious problems. A possible pathway to cope with the high demand and the lack of infrastructure to deliver parenting programs is the public health approach.

#### **Conclusions**

It was concluded from the current study results that the majority of studied mothers had unsatisfactory level of knowledge regarding shaken baby syndrome hazards and 91.9% of the mothers participate in the study have inappropriate attitudes and beliefs regarding shaken baby syndrome hazards. And there was a statistically significant relation between family socioeconomic status and knowledge regarding shaken baby syndrome hazards.

#### **Recommendations**

**Based on the findings of the current study, the following recommendations are suggested:**

Mothers should be educated about shaken baby syndrome hazards and receive written information prior to discharge from maternal and pediatric hospital. The parents' information leaflet should preferably be available in simple Arabic languages.

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